Rethinking Design-Based Approaches for School-Based Improvement: The Experience of the TAMAM Project

Rima Karami Akkary1 and Jennifer DeKnight1

Abstract
The School Based Reform in Arab Countries (TAMAM) project aims to build leadership capacity for school-based reform. This paper asks: (a) To what extent can a design-based approach frame the design of school improvement projects such as TAMAM? (b) What characteristics of design-based approaches are most relevant to guide the design of school-based improvement projects? Results of the qualitative analysis demonstrate that a design-based approach can be used to describe TAMAM and highlight the most important elements. This study proposes that design-based approaches be used for designing and describing comparable school-based improvement initiatives, especially in contexts similar to the Arab region.

Keywords
design-based research, design-based implementation research, school improvement, Arab countries

There is widespread evidence that educational systems in Arab countries need to be improved. The United Nations Development Program’s (UNDP) (2002) Arab Human Development Report argues that quality of education in the Arab region has deteriorated, implying a decline in knowledge acquisition and analytic and creative skills. The World Bank (2007) and Hoel (2014) echo the conclusions of the UNDP report by suggesting

1Department of Education, American University of Beirut, Beirut, Lebanon

Corresponding Author:
Rima Karami Akkary, Department of Education, American University of Beirut, Beirut, Lebanon. Email: ra10@aub.edu.lb
that the quality of education in the Arab region is falling behind other regions, especially in science and math as indicated in the Programme for International Student Assessment 2015 results (OECD, 2016) and the Trends in International Mathematics and Science Study results (Martin, Mullis, Foy, & Hooper, 2016; Martin, Mullis, Foy, & Stano, 2012; Mullis, Martin, Foy, & Arora, 2012; Mullis et al., 2016). Beyond standardized tests, research indicates that students are not graduating with the basic technical and soft skills needed for employment (Hoel, 2014), indicating a disconnect between education and market needs. Despite regional gains in access to education, literacy rates, and gender parity in enrollment, there is an urgent need for reform that focuses on developing the human capacity of schools and education systems (World Bank, 2007) in order to improve quality and address the development needs of the 21st century.

A careful survey of the terrain of educational reform in Arab countries over the past few decades shows that most Arab countries have attempted to reform education. However, reform has been conceptualized, initiated, funded, managed, and evaluated at the level of the ministries of education or other governmental institutions. This reform takes place without meaningful participation of those intimately affected by the reform such as teachers, principals, students, and parents (El-Amine, 2005; Karami Akkary, 2014). This approach stands in contrast to research evidence, which suggests that bottom-up approaches are more effective in strengthening community participation in decision-making than top-down ones (Cameron, Moses, Gillies, & Herstein, 2006; Fullan, 2007, 2009) and that involving all stakeholders is necessary for the success of educational reform (Maroun, Samman, Moujaes, & Abouchakra, 2006). In addition, there is the problem of scarcity of indigenous research on educational reform that can inform decision makers in Arab countries about the best ways to initiate and implement reform. Instead, most ideas for educational reform in Arab countries have been “borrowed” from research and development activities conducted in Western countries whose cultural contexts are very different (Karami Akkary, 2014).

It is in the above context the project entitled “School Based Reform in Arab Countries” (TAMAM) was initiated in 2007 at the American University of Beirut, Lebanon, to address the regional problem of ineffective educational reform by implementing leadership capacity building for school-based reform. TAMAM hopes to improve educational quality in the Arab world by introducing bottom-up reform that focuses on human capacity and is grounded in research on effective school-based improvement, contrasting previous reform efforts.

This paper examines the TAMAM project based on characteristics of design-based approaches to education research and discusses if they can be a useful framework to describe and guide school improvement projects. TAMAM did not begin with a set commitment to a design-based approach; instead, the project design acquired unique characteristics in response to the emerging challenges during initiation and implementation processes (Karami-Akkary, Saad, & Katerji, 2012).

The next section presents as background a brief overview of the TAMAM project and the characteristics of effective school-based reform, as well as the characteristics of design-based approaches used to inform the data analysis. Then, a description of the
methodology used to select data sources and conduct analysis is followed by a presentation of the results and a critical discussion regarding the applicability of a design-based approach to school-based reform. The paper ends with a proposed framework to be applied to similar reform projects, concluding remarks and suggestions for further research.

Addressing the Need for Reform: TAMAM Project

TAMAM began as a school-based reform initiative in three Arab countries—Jordan, Lebanon, and Saudi Arabia—and three private schools from each country were selected to participate in the project. The schools are expected to form teams that include teachers, instructional supervisors, and the principal in order to undergo a job-embedded professional learning experience designed around a school-based improvement journey. While on the journey, team members learn how to initiate, plan, implement, and evaluate a school-based improvement project while at the same time acquiring competencies that build their capacity for leading change. TAMAM is now a network of Arab educators and educational institutions across seven countries and 40 educational institutions with the following mission:

TAMAM is an educational movement that triggers and supports school-based improvement initiatives to achieve sustainable school improvement. It aims at improving student learning to equip them with the knowledge, skills and attitudes of the 21st century. TAMAM combines research with development to bring about and support school-based initiatives for sustainable school improvement. It also aims to build a homegrown theoretical understanding of effective school reform that is grounded in evidence and in the cultural context of the Arab region. Consequently, TAMAM seeks to change practitioners’ conceptual frameworks and professional beliefs and transform schools to professional learning communities with adaptive and self-renewing structures. (TAMAM, 2016)

The project’s vision for effective reform is based on building the conditions that lead to top-down support for bottom-up change, as recommended by the literature on successful school improvement (Dimmock, 2012; Fullan, 1993, 2007). TAMAM aligns with key recommendations for effective school reform (Karami-Akkary, El Saheli, & Mansour, 2016), such as taking context into consideration (Dimmock, 2012; Earl & Lee, 2000; Ryan, Kang, Mitchell, & Erickson, 2009) and building leadership capacity among school members through collaboration and distributed leadership (Dimmock, 2012; Guhn, 2009; Hauge, Norenes, & Vedøy, 2014). The TAMAM model has been widely implemented and well-received by 350 practitioners in 46 schools, both public and private, across the Arab region. A recent case study assessing growth in the targeted competencies demonstrates the TAMAM model’s success in building a school team’s capacity to lead school-based improvement (Karami-Akkary et al., 2016).
In addition to building capacity at the school level to implement reform activities, the project team of researchers concurrently analyzes experiences of the school-based initiatives as compared to international literature to identify the human and material factors and practices that hinder or facilitate these initiatives. The results were used to construct a “homegrown” and grounded theory of educational reform formulated by local researchers who have intimate knowledge and insights about the Arab region that offers contextualized solutions to educational authorities using data from local schools.

Effective Reform and Design-Based Approaches

Literature on school improvement highlights the importance of the process followed to design and implement improvement initiatives (Earl & Lee, 2000; Fullan, 2009; Fullan, Cuttress, & Kilcher, 2005; Guhn, 2009). Particularly, researchers have recommended inquiry-based approaches that use research methods as a way to collect data for monitoring at all stages (Deppeler & Ainscow, 2016; O’Sullivan, 2002). They also recommend flexibility in design and emphasize the importance of responsiveness to the local context and conditions surrounding the implementation (Hauge et al., 2014; Murphy, 2013; Ryan et al., 2009) and building leadership capacity among school members for improvement (Dimmock, 2012; Guhn, 2009; Hauge et al., 2014).

Further review of the literature reveals that many of the same characteristics of effective implementation of school-based improvement define design-based approaches in education. Design-based research (DBR), sometimes referred to as design-based experimentation, is a model that has been gaining increased attention among educational scholars (Anderson & Shattuck, 2012; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; McKenney & Reeves, 2013; The Design-Based Research Collective [DBRC], 2003; Wang & Hannafin, 2005). Design-based implementation research (DBIR) is a recent development of inquiry-based design research that focuses particularly on implementation (Adams, Lo, Goodell, & Nachtingal, 2017; Leary et al., 2016; LeMahieu, Nordstrum, & Potvin, 2017; Penuel & Fishman, 2012; Penuel, Fishman, Haugan Cheng, & Sabelli, 2011). Both models are most commonly used for classroom research or research focused on teaching and learning (Anderson & Shattuck, 2012; LeMahieu et al., 2017).

The identified convergence between these design-based approaches and effective implementation practices for school improvement constitutes the leading premise of this paper. While such approaches are recognized as effective methods at the level of the classroom, this study proposes that the use can be extended to guide the design of school-based reform. The TAMAM Project was selected as a case to examine this claim. In this study, researchers conducted an investigation in order to identify design-based characteristics present within the design of TAMAM. The findings of this study highlight the prominent characteristics of design-based approaches that are relevant to effective school reform and designing school-based reform projects, particularly in the
Arab region. Therefore, the purpose of this paper was to answer the following questions:

1. To what extent can a design-based approach frame the design of school improvement projects such as TAMAM?
2. What characteristics of design-based approaches are most relevant to guide the design of school-based improvement projects?

**Characteristics of Design-Based Approaches in Education**

With origins in the work of Brown (1992) and Collins (1992), DBR in education is “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world setting and leading to contextually-sensitive design principles and theories” (Wang & Hannafin, 2005, p. 6). Shavelson, Phillips, Towne, and Feuer (2003) suggest that DBR “seeks to trace the evolution of learning in complex, messy classrooms and schools, test and build theories of teaching and learning, and produce instructional tools that survive the challenges of everyday practice” (p. 25).

DBIR is a more recent iteration of a design-based approach in education that developed with a bent toward organizational change and quality improvement and the idea of scaling interventions beyond a single classroom (Penuel & Fishman, 2012; Penuel et al., 2011), of particular relevance to the TAMAM model. DBIR is characterized by four specific principles, many of which overlap with DBR:

1. “Focus on persistent problems of practice in education systems from multiple stakeholders’ perspectives
2. Commit to iterative and collaborative design
3. Develop theory, knowledge, and practice related to both program classroom learning and implementation through systematic inquiry
4. Develop capacity for sustaining change in systems” (LeMahieu et al., 2017, p. 30)

In considering the two design-based approaches, a number of characteristics align and inform the conceptual understanding for this study. These characteristics are (a) pragmatic; (b) grounded in theory and a real-world context; (c) iterative and flexible process; (d) ongoing collaborations among researchers and practitioners; and (5) produces contextually relevant outcomes. While both DBR and DBIR have additional and significant other characteristics, the five characteristics listed represent an overlap between the two approaches as identified by the researchers. Each characteristic will be discussed below.

**Pragmatic.** Researchers (Cobb et al., 2003; DBRC, 2003; Sandoval & Bell, 2004; Wang & Hannafin, 2005) agree that DBR simultaneously strives to accomplish two goals: to
improve problems of practice through intervention and to refine and develop theories. DBR and DBIR are “practice-centered” and emphasize the engagement of practitioners as stakeholders in identifying persistent problems of practice (Penuel et al., 2011, p. 332). At the same time, this approach leads to the development and/or refinement of domain-specific learning theories (Cobb et al., 2003; Wang & Hannafin, 2005). DBR promotes the adoption of innovations (DBRC, 2003) by generating design principles (Anderson & Shattuck, 2012; Wang & Hannafin, 2005), which provide a theoretical framework for planning and implementing prospective designs (Cobb et al., 2003). DBIR, in particular, emphasizes the development of theories that seek to understand how an intervention works within the context it is conducted in order to identify ideal conditions for implementation (LeMahieu et al., 2017).

**Grounded in theory and a real-world context.** In addition to being a significant outcome, theory provides an essential foundation for design-based interventions. According to the DBRC (2003), “interventions embody specific theoretical claims about teaching and learning and reflect a commitment to understanding the relationships among theory, designed artifacts and practice” (p. 6). Collins (1992) and Sandoval (2004) further stress that the use of an underlying theory to support the framework and procedures of design is indispensable for theory development. Design-based approaches are also grounded in a real-world context (Wang & Hannafin, 2005), whereby the design process is initiated to address problems that are relevant to practice (Edelson, 2002; Penuel et al., 2011). Furthermore, the interventions are carried out in a real-world setting where complex social interactions occur (Collins, Joseph, & Bielaczyc, 2004; Wang & Hannafin, 2005), and a myriad of dependent variables influences the teaching and learning process (Collins, 1992; Collins et al., 2004).

**Iterative and flexible process.** Design-based approaches are characterized by successive iterative cycles of design, implementation, analysis, and redesign (DBRC, 2003; Penuel et al., 2011) with the aim of effectively improving a particular activity or artifact (Shavelson et al., 2003). The iterative nature also dictates that the design process be flexible (Leary et al., 2016; Wang & Hannafin, 2005). Since implementation is conducted in real-world contexts, it responds to the participants’ experiences as they occur. Therefore, designs are modified, improved, and adapted as needed throughout the process and not expected to be rigid and unchanging (Barab & Squire, 2004; LeMahieu et al., 2017).

**Ongoing collaborations among researchers and practitioners.** DBR and DBIR emphasize the importance of ongoing collaborations among researchers and practitioners throughout the duration of the design process (Cobb et al., 2003; Penuel et al., 2011), from initial problem identification until the creation and publication of theory and design principles (Anderson & Shattuck, 2012; van den Akker, 1999). Researchers provide advice and guidance to participants, while participants give feedback and help to shape research designs and identify problems of practice (Barab & Squire, 2004; Wang &
Hannafin, 2005), facilitating an equal partnership (LeMahieu et al., 2017). Collaboration also contributes to capacity building, as practitioners learn with researchers how to collect and analyze data and researchers learn with practitioners how to operate within messy educational systems (LeMahieu et al., 2017).

**Produces contextually relevant outcomes.** Since design-based approaches are grounded in problems of practice and conducted in real-world contexts, the design principles and theories that are generated from this type of research are contextual (DBRC, 2003). Given that various context-dependent variables influence the outcomes of design (Brown & Campione, 1996; van den Akker, 1999), the theories derived should not be “grand theories,” which can be uniformly applied in any context (Anderson & Shattuck, 2012; Cobb et al., 2003). The overall intent is not merely to explore the processes in a particular setting but to generate outcomes within the given context (Cobb et al., 2003).

**Research Methods**

**Data Sources**

To investigate the study’s research questions, secondary data previously collected by the Project Steering Team (PST) and available documentation were consulted. Specifically, data sources for this study come from published TAMAM documents and journals of members of the PST. *TAMAM: Voices from the Field*, one of the main sources of data for this study, documents testimonials from school team members (teachers and principals), university faculty members and researchers, and the PST who participated in the TAMAM project during its first 3 years of operation in Jordan, Lebanon, and Saudi Arabia (Jurdak, 2015). The testimonials take the form of reflective narratives describing TAMAM learning experiences. Since the testimonials are not direct responses to specific questions but instead present authentic, critical reflections about the project, they serve as an appropriate data source to investigate characteristics of TAMAM from varied perspectives.

Another main source of data for this study are TAMAM technical reports, written by members of the PST (Jurdak & BouJaoude, 2011; Karami-Akkary & ElSaheli Elhage, 2013; Karami-Akkary & Rizk, 2011; Karami-Akkary et al., 2012). The technical reports document the progress of the project, lessons learned, and critical reflections from the ongoing action research carried by the PST. They also provide details on the project’s goals, objectives, theoretical background, design, implementation, and monitoring processes. Finally, PST members’ journals were consulted after the initial data analysis.

**Data Analysis Rubric and Procedures**

The researchers adopted a constructivist paradigm, assuming that individuals construct their reality (Merriam, 2009). A qualitative analysis is therefore the most
appropriate method for understanding the characteristics of TAMAM from the participants’ perspectives, and the data sources selected best offer rich descriptions of the TAMAM experience. The characteristics of design-based approaches presented above informed the qualitative data analysis of the multiple sources data. This analysis was guided by a rubric that was constructed based on the theoretical characteristics of design-based approaches, including DBR and DBIR, described above, while researchers remained open to emerging insights that emerged from the TAMAM experience. Key element(s) for each of the five characteristics were derived from a review of the literature. Table 1 presents the rubric that was used in the data analysis.

Using the constant comparison method (Corbin & Strauss, 2008) as an analytic tool allowed the researchers to identify incidents within the data that represent the larger categories, or characteristics, and the more specific properties of those characteristics, or key elements. The researchers analyzed the collected data at two levels to establish the extent to which each key element and characteristic was present.

First, the published TAMAM documents were reviewed in order to mark occurrences of the key elements to determine how often the testimonials and written reports demonstrated the characteristics, with special attention paid to the testimonials as they reflect the voices of all categories of TAMAM participants. When identifying key elements, phrases, complete sentences and meaningful paragraphs or groups of sentences were considered. Total frequencies for each of the five characteristics as well as each key element were determined by counting the number of tallies.

Table 1. Total Frequencies for the Key Elements and for Each Characteristic.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Key Element(s)</th>
<th>Frequency of Key Elements</th>
<th>Frequency of Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pragmatic</td>
<td>Addressing problems of practice through intervention</td>
<td>254</td>
<td>278</td>
</tr>
<tr>
<td></td>
<td>Developing and/or refining theories</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Grounded in theory and real-world context</td>
<td>Designing and improving interventions based on research, theory, and practice</td>
<td>179</td>
<td>337</td>
</tr>
<tr>
<td></td>
<td>Carrying out interventions in real-world settings</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Making evidence-based decisions</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Iterative and flexible</td>
<td>Improving intervention through successive cycles of design, implementation, analysis, and redesign</td>
<td>89</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>Evolving plan</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reflective practice as method of improvement</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Collaborative</td>
<td>Practitioner’s active role in implementation and as a researcher</td>
<td>63</td>
<td>549</td>
</tr>
<tr>
<td></td>
<td>Researcher’s collaborative approach in research and regular guidance</td>
<td>442</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Having a unified goal/common purpose</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Contextual</td>
<td>Outcomes/results particular to a specific school setting</td>
<td></td>
<td>218</td>
</tr>
</tbody>
</table>
Second, the researchers followed the constant comparative methodology to analyze the data. The rubric was used as a lens through which the documents were analyzed. The rubric’s characteristics and key elements were treated as initial theoretical codes to guide the process of forming a deeper understanding of the data from the perspectives of the participants. Though they were used to evaluate the extent of alignment of the TAMAM experience with DBR, the rubric’s elements were held provisionally while remaining open to emerging themes and understanding from the data. PST journals were consulted during the analysis in order to support these emerging themes.

Measures were taken to ensure the credibility and trustworthiness of the study as per Merriam (2009). Multiple sources of data (Merriam, 2009) ensured triangulation. The process included two consecutive readings of the testimonials by one of the researchers in order to mark occurrences of the key elements. In order to ensure accuracy of the categorization of the elements, a portion of the testimonials were recategorized by the same researcher after a 2-week period. A comparison between the original and new categories showed a 94% agreement. Finally, another educational researcher was asked to separately code the results in order to check if the emerging themes are similar.

### Results

Results of the analysis show that the selected characteristics of design-based approaches are represented in the data, albeit in varying degrees. Specifically, the frequency found in the testimonials and technical reports analyzed were in decreasing order: collaborative (549), grounded in theory and real-world context (337), iterative and flexible (301), pragmatic (278), and contextual (218). Table 1 presents the total frequencies for each characteristic and for each key element. Each of these characteristics is described below along with representative excerpts from the analyzed data.

### Collaborative

The TAMAM project most clearly demonstrates the “collaborative” characteristic as the most common across all data (587). The original project design emphasized collaboration between researchers and practitioners with practitioners engaged as stakeholders in identifying problems of practice and actively supporting research through capacity building, and this manifested in implementation. The collaborative characteristic is demonstrated by the key element “Researcher’s collaborative approach in research and regular guidance” (442). PST members, while working as researchers, conduct periodic workshops and school visits, instruct participants on specific skills and concepts, and guide the participants at each stage of their school team–selected projects. Researchers involved in the project seemed to play a dual role of researcher and guide, and this was repeatedly recalled by school team members and the PST alike. This dual role provided practitioners with needed skills and support for them to develop as researchers. Many of the testimonials and reports...
pointed out that the PST’s approach encouraged collaboration with participants at all stages of the project, and the PST used information gained in order to inform project design and improvement, monitoring and evaluation methods, and development of tools.

According to the PST, an intimate knowledge of the needs of the participants resulting from collaborative work was integral to their design-related decisions:

…throughout the project, the PST collected and documented data from each school…to examine critically the school teams’ progress…then to offer the support needed to sharpen the understanding of the competencies the practitioners were developing. (Technical Report 4, p. 59)

This point was also highlighted in the testimonials of one school team member:

The purpose of the TAMAM team’s [researchers] visit to Jordan was not only to provide support on location [to participants] but to explore the progress of the participants’ understanding of the previous workshops and to see what was important to be tackled in the upcoming workshop. [Participant 12 (P12), school team member]

School team members further explained that the PST modeled collaboration in their actions and approach:

…our development [throughout the project] was largely due to the embodiment of the pillars of TAMAM by the University team [PST] who guided, supported and trained us. They gave us confidence and provided us with knowledge and experience with great competence and professionalism. (P11, school team member)

**Grounded in Theory and Real-World Context**

TAMAM demonstrates “grounded in theory and real-world context” as the second most frequently mentioned characteristic (337). Data demonstrates that research and theory are consulted at all levels of TAMAM, from the school teams designing school-specific projects to the PST designing the overall implementation plan of TAMAM. Decisions are informed by evidence, and researchers design professional development interventions to be conducted at real schools in varied settings as opposed to testing out theories in a controlled environment.

**Designing and Improving Interventions Based on Research, Theory, and Practice**

The characteristic is most clearly demonstrated by this most frequent element (179). The PST established the project with a goal of designing and improving
interventions based on research, theory, and practice. Significant research was conducted, and school improvement theories were considered before action research selected as the method for capacity building. As explained in *Technical Report 4*:

The TAMAM model brings research to the center of school reform, not only as a tool to build capacity, but also as a tool for knowledge production that is grounded in practice and the contextual and cultural realities of schools (p. 39)

Based on their review of available literature and best practices, the PST chose collaborative action research as the inquiry model to learn in TAMAM. (Technical Report 4, p. 46)

The PST encouraged participants to do the same kind of research for their school-based projects. Testimonials highlighted that, throughout the process, both the PST and the participants’ theory and research became tightly connected to practice:

It became necessary for every teacher to realize the importance of documentation and searching for support for their claims [researching] because this provides them with indications of whether or not to continue in what they are doing or to look for a more useful way. This is done through evidence from the teacher’s own work or their students’ work. (P9, school team member)

*Making evidence-based decisions.* TAMAM school and university participants emphasized the importance of using evidence to make decisions throughout various phases of the project, demonstrating this key element across all data sources (124). The PST-based planning and implementation decisions on data they collected through monitoring the progress of the implementation:

Decisions regarding the sequence and choice of the activities performed during the PD implementation were based on evidence derived from this collected data. (Technical Report 4, p. 63)

At the outset of the project, the PST conducted professional development activities to build evidence-based decision-making skills among participants, and it later was solidified as one of the TAMAM Pillars:

…evidence-based decision-making was introduced as a tool for effective improvement, and the teams were asked to build plans for action that are based and rationalized by the findings from their research data. (Technical Report 3, p. 17)

School team members reflected on obtaining and making use of the skill during the project:
[Our purpose was to] analyze information and draw conclusions and recommendations and present them to decision-makers in order to help them make appropriate decisions that are based on practice and on experience and evidence. (P11, school team member)

…we were aware of the importance of making school-related decisions based on evidence from practice rather than on personal impressions or on the basis of plans made on paper. (P7, school team member)

Iterative and Flexible

TAMAM seems to demonstrate the characteristic of “iterative and flexible” in (301) utterances. The PST emphasized flexibility from the outset. The school teams witnessed and learned from the PST’s use of cycles of design, implementation, analysis, and redesign in order to do the same for their school projects.

Reflective practice. The PST spent significant time training the participants on reflective practice (120) as one of the main competencies for professional development. The PST also made efforts to model reflective practice in its own processes in order to teach the school teams by example:

The school teams were introduced to reflective practice, and were provided with multiple opportunities to experience reflection on practice. (Technical Report 3, p. 17)

[The PST] remained vigilant in keeping record of their actions and engaged in cycles of technical and critical reflection not just to examine how they surpassed the goals they set but also to question these goals and critically examine the processes followed to reach them. (Technical Report 4, p. 58)

TAMAM participants highlighted the importance of reflecting on their practices throughout various phases of their projects:

After we chose reflective practice as one of the pillars of TAMAM… I became obsessed with constantly reflecting in order to become more conscious of what I was doing. I would go back and reflect on all my work and I would not be ashamed to modify what I did... (P9, school team member)

In the PST research study reported in Technical Report 1, the PST analyzed the impact of TAMAM interventions on the use of reflective practice among participants, further demonstrating the centrality of this key element:

The habit of mind which received the highest percentage of positive instance (39 incidents accounting for 43% of the total incidents of the habits of mind subscale) was being “reflective in their own professional practice.” (Technical Report 1, p. 26)
**Evolving plan.** In order to help the school teams become more comfortable with the fluid nature of planning and implementation, the PST modeled the evolving design approach (92). The approach informed implementation, monitoring, and evaluation throughout the project. The PST team members described their project design as evolving, pointing out that:

The planning and implementing of the PD [professional development] activities in TAMAM follow an evolving design plan where decisions on actions – and their sequence – are based on evidence generated through the monitoring of the progress of the training, and the steering of it as it unfolds. (Technical Report 4, p. 57)

...decisions regarding the sequence and the choice of the activities, performed during the implementation, were determined through a process of ongoing data collection and analysis of the school teams progress, thus tracking the challenges faced as well as the lessons learned. (Technical Report 3, p. 16)

Evolving plan became an integral part of TAMAM and was selected as a TAMAM Pillar. School team members reflected on using an evolving plan approach at the school project level:

We changed the goals of the research project several times; we spent a long time discussing the purpose of the research and its relation to the school’s mission and in choosing the suitable data collection tools and methods. (P19, school team member)

**Pragmatic**

TAMAM displays the “pragmatic” characteristic (278) in the sense that it addresses specific problems of practice. Data shows that the focus of the project was on addressing specific needs rather than perceived global problems. However, the data demonstrates that the pragmatic characteristic also contains the lowest key element of “developing and/or refining theories” (24).

**Addressing problems of practice through intervention.** School team members and PST alike reflected on how TAMAM and individual school projects linked to practice, demonstrating this key element (254). The PST selected learning goals to build participants’ capacity by addressing individual skills related to school reform that were found lacking. In turn, the PST encouraged participants to develop school projects to address particular issues of practice. The PST reports highlight that the initial project goals were derived from a thorough study of the shortcomings of reform attempts in the region:

Based on the initial goals, the PST planned to train the school teams in order to acquire the following competencies: (1) inquiry/evidence based decision; (2) collaboration; and (3) documentation. (Technical Report 4, p. 45)
The PST continually identified goals based on problems of practice as the project progressed and ensured that the participants were moving toward those goals:

These [monitoring] criteria help determine whether the schools are acquiring the targeted knowledge, skills, and attitudes while progressing along the journey’s path. (Technical Report 5, p. 41)

Excerpts from school members’ reflections pointed at their awareness that the project’s focus was improvement at the individual school level as opposed to more generalizable goals:

[The project aims at] significant educational reform in the Arab region based on successful local school improvement projects that can be expanded to fit other educational institutions. (P19, school team member)

School improvement should stem from the school itself and a successful experience in one school may not be valid or successful in another school, even if the schools are located in the same country or city. (P27, school team member)

**Developing and/or refining theories.** This is the least frequent element in the data analysis (24); however, discussion of developing theories is present in the data and in the theoretical models developed by TAMAM. Excerpts from testimonials demonstrate that participants and the PST describe how developing theories is a primary goal of TAMAM:

TAMAM has the added purpose of developing a homegrown grounded theory of school reform relevant to the Arab states. (Technical Report 1, p. 15)

The project [TAMAM] also aimed to develop school improvement theory based on the study of the factors that encourage or impede the school improvement process in Arab schools. (P20, school team member)

TAMAM has successfully produced grounded theoretical understanding of school-based improvement in an Arab context, such as a design for a job-embedded capacity building model in the Arab world, the TAMAM School Improvement Journey, and a set of professional principles, the TAMAM Pillars (Technical Report 4; Technical Report 5). Although developing theories is discussed as a goal of TAMAM and the theories themselves are presented in the technical reports, the data do not seem to present frequent indications of this key element.

**Contextual**

TAMAM demonstrates the characteristic of “contextual” (218) in the data sources reviewed. A desired outcome of TAMAM is to develop contextualized theories and
designs for future implementation in the Arab world. As a result of the initial phase, a number of contextually based outcomes have been developed. These include the TAMAM competencies, TAMAM Pillars, the TAMAM School Improvement Journey, the TAMAM rubric to monitor progress, and the planning templates utilized in TAMAM:

One of the main milestones that the project reached at the conclusion of its first phase was the development of a set of 11 pillars that were adopted as foundational principles, that capture the beliefs, attitudes, and practices that the project’s professional development activities aimed at helping the school teams acquire. (Technical Report 5, p. 9)

These products have developed as a result of practice specific to the Arab world and are grounded in the context of participating schools, informed by internationally recognized best practices. The PST’s reports highlight barriers that are specific to the Arab context and present lessons learned to guide educational practitioners in that context. Documentation is a case in point:

As soon as the project commences, team members should immediately be trained on documenting practices and the PST should be persistent in following up on the team progress on that front as well as with regards to the quality of the documents produced.... In a culture not used to documentation, training and guidance on the different forms and uses of documentation were needed; in addition to a few tips regarding how to organize what was documented. (Technical Report 4, p. 116)

Discussion

The results of this study provide evidence that the TAMAM project, as a case of school-based reform, can be considered as employing a design-based approach by demonstrating the main characteristics as shown in the previous section. Accordingly, TAMAM could represent an instance, though unintended by its designers, to the broader application of a design-based approach beyond the confines of classroom learning as a framework to design and evaluate school-based reform. Bell (2004), while proposing that DBR be considered a unique form of scholarly inquiry, suggested that “existing work within these perspectives [education, organizational behavior, social work, etc.] might lend themselves easily to being interpreted as design-based research” (p. 251). While DBR continues to grow as an approach in educational research, Bell (2004) encourages the broadening of its definition and application beyond its common use in classroom and curriculum interventions (Anderson & Shattuck, 2012). DBIR moves toward filling this gap by scaling up classroom interventions with a focus on capacity building (LeMahieu et al., 2017); however, it remains focused on improving teaching and learning. Therefore, the results of this study support the claim that a design-based approach that incorporates characteristics from both
models can be useful for examining school-based reform projects aiming at school-wide impact, and it can be used to frame and guide their design.

**TAMAM as a Design-Based Approach**

This study indicates that TAMAM, a school-based reform project, which follows a design that is aligned with the recommendations for effective school improvement, evolved to exhibit characteristics of design-based approaches. The results serve to demonstrate that key elements of the five main characteristics that emerged from the literature on DBR and DBIR are sufficiently supported by the data: collaborative, grounded in theory and real-world context, iterative and flexible, pragmatic, and contextual. However, noted variations in elements under each characteristic as demonstrated in Table 1 provided researchers with the opportunity to identify the most prominent elements of a design-based approach that can be of use to designers of school-based reform similar to TAMAM, offering instances of how these characteristics can be applied.

Researcher’s collaborative approach in research and regular guidance was the most frequent element and best represents this characteristic when describing TAMAM. PST members, while working as researchers, guide the participants at each stage of their school team–selected projects to build their capacity as researchers themselves. Participants are engaged as stakeholders in redesigning iterations of the project as well as producing project outcomes. DBR and DBIR involve collaboration between researchers and practitioners at all stages of implementation, from problem identification to development of theories (Anderson & Shattuck, 2012; Penuel et al., 2011).

On the other hand, other aspects of collaborative, such as having a unified goal/common purpose, proved to be less important than collaborative processes followed in the project that aim toward professional development as demonstrated by the low frequency in the analysis. This might indicate that the participants and researchers accorded higher priority to promoting collaborative professional learning. These findings can alert researchers to the refinement needed to accord relative weight to the aspects that are of higher relevance to the implementation of school improvement.

TAMAM design is found to be informed by research and theory on effective school improvement, school-based reform, and professional development. At the same time, the data show that the school teams are required to conduct their own research and learn how to make evidence-based decisions at the school project level. As result, the characteristic grounded in theory and real-world context is best exemplified in the data by the element designing and improving interventions based on research, theory, and practice and making evidence-based decisions, aligning with this feature found in design-based approaches (Adams et al., 2017; DBRC, 2003; Wang & Hannafin, 2005).

The iterative and flexible design characteristic is most apparent in TAMAM with the element reflective practice. Reflective practice formed a key part of the project design from the beginning, while, on the other hand, the idea of using an evolving plan was adopted in response to the context and has since become a cornerstone of TAMAM.
As such, the characterization of following an iterative and flexible design (Barab & Squire, 2004; DBRC, 2003; Penuel et al., 2011; Wang & Hannafin, 2005) has been reflected in TAMAM’s processes of changing and adapting its design in response to the needs and critical reflection of the schools and participants.

TAMAM demonstrates the pragmatic characteristic by addressing specific problems of practice through intervention. If DBR has two goals of improving practice and refining and developing theories (Cobb et al., 2003; Penuel et al., 2011; Wang & Hannafin, 2005), then the data show that TAMAM has a much stronger emphasis on the former. In TAMAM, the project activities are often analyzed while they are still ongoing and not at the end of the project when theories have been fully developed and tested. In fact, Anderson and Shattuck (2012) and McKenney and Reeves (2013) advocate for a greater emphasis on the practical impact of improving practice over developing theories. In fact, Wang and Hannafin (2005) indicate that moving beyond evaluating research to developing theories and design models can present challenges for project designers. Therefore, TAMAM’s designers apparent favoring of improving practice is not surprising and could be considered a call to allow for it when designing similar school-based project following the design-based approach. Interestingly, data do prove that TAMAM has successfully developed grounded models, which shows that this favoring has not obstructed demonstrating the characteristic of theory development.

Taking a design-based approach such as DBR or DBIR means producing contextually relevant outcomes to address practical problems being addressed (Anderson & Shattuck, 2012; Cobb, Jackson, Dunlap, & English, 2015; LeMahieu et al., 2017). Similarly, TAMAM emerged as a method for bottom-up education reform in the Arab world and remains committed to producing outcomes specific to the needs of the region and also each school. The contextually relevant outcomes produced, such as the TAMAM School Improvement Journey and TAMAM Pillars, as well as the interventions locally designed by the participating school teams, are rooted in the experiences of the participants.

Based on this discussion, it can be concluded that the design and implementation process of the school-based reform project TAMAM can be described as a design-based approach based on common characteristics of DBR and DBIR. Moreover, the results highlight the most important elements as reflected in the application of this approach in TAMAM, offering an opportunity to propose refinements that will make this approach more applicable in the context of school-based reform. Table 2 offers a redefined framework, as described above, that can be applied to other school-based reform projects.

**Design-Based Approach as a Framework for School-Based Reform**

Design-based approaches are less commonly employed for school-based reform compared to specific teaching interventions. The results of this study offer support for using a design-based approach as a framework to describe and evaluate other school improvement projects, either concluded or in progress. Anderson and Shattuck (2012)
indicated that teacher training accounted for only 9% of DBR studies in their review; moreover, when used in teacher training, DBR was not used for the purpose of school improvement. The studies profiled specifically focused on teaching and learning in the classroom, categorized as either interventions in “instructional method/model/strategy” or “technological” (Anderson & Shattuck, 2012, p. 21). Moreover, Anderson and Shattuck (2012) conclude from their review of research that the DBR interventions presented in the literature “could be characterized as small improvements to the design, introduction and testing of sustaining technologies and practices in classroom or distance education contexts” (p. 24) and suggest that DBR may not be useful for extensive reform and change.

Although DBIR has moved design-based approaches beyond an individual classroom in order to support the scaling of interventions and, importantly, capacity building of researchers and practitioners (Penuel & Fishman, 2012; Penuel et al., 2011), it has not yet become an approach commonly used for school reform. Utilizing a design-based approach as a framework to describe and understand school improvement contributes to broadening the application of such models in education research. Based on the review of research, the characteristics of DBR and DBIR (Anderson & Shattuck, 2012; DBRC, 2003; LeMahieu et al., 2017; Penuel et al., 2011; Wang & Hannafin, 2005) and effective school improvement (Deppeler & Ainscow, 2016; Dimmock, 2012; Earl & Lee, 2000; Fullan, 2007; Ryan et al., 2009) overlap, such as collaborative, contextual, inquiry-based, flexible, and design process-oriented. Analysis of TAMAM’s model seems to indicate a promising application of a design-based model for teacher capacity building and school change in multiple schools and countries in the Arab region.

Additionally, TAMAM has built participants’ capacities for effective school-based reform in some of the very skills and values that DBR and DBIR assume to be inherent: reflective practice, collaboration, documentation, and research. In Western contexts or classroom-centered design-based projects, the assumption is that participants will utilize reflective practice, collaboration, documentation, and evidence-based decision-making as a means to achieve some other end. TAMAM was designed, in part, to challenge existing paradigms, especially in the Arab context, and introduce these

Table 2. Characteristics of Design-Based Approaches for School Improvement.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Key Element(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pragmatic</td>
<td>Addressing problems of practice through intervention</td>
</tr>
<tr>
<td>Grounded in theory and real-world context</td>
<td>Designing and improving interventions based on research, theory, and practice</td>
</tr>
<tr>
<td>Iterative and flexible</td>
<td>Evolving plan</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Researcher’s collaborative approach in research and regular guidance</td>
</tr>
<tr>
<td>Contextual</td>
<td>Outcomes/results particular to a specific school setting</td>
</tr>
</tbody>
</table>
competencies as habits of practice (Karami-Akkary & ElSaheli Elhage, 2013). As the data indicate, many of the professional development activities in TAMAM focus on building these competencies, aligning with this main principle of DBIR (Penuel et al., 2011). Consequently, building the skills needed to implement a design-based approach seems to have emerged as a goal of TAMAM, serving to empower teachers and administrators to carry out school-based reform initiatives. TAMAM’s design and implementation experience demonstrates that the highly collaborative nature of an approach such as DBIR supports and greatly overlaps with the highly responsive capacity building activities of this school improvement project, indicating that design-based approach can be used as a model for building capacity beyond the classroom for school improvement.

It can be concluded from the results that the framework of characteristics for effective school reform provided in Table 2 can be used to enhance and inform the design of other school-based improvement interventions. While the five characteristics of design-based approaches remain, the key elements that describe these characteristics have been modified based on the analysis of the design of the TAMAM project.

Based on an analysis of educational reform efforts in the Arab world, Karami Akkary (2014) argues that reform in the region should follow an evolving design and inquiry-based approach, incorporate collaboration with practitioners for the purpose of capacity building, and respond to the local context in order to generate an empirical knowledge base that is “homegrown.” Thus, reexamining the characteristics of design-based approaches such as DBR and DBIR in light of the findings of this study might be critical to guide the development of a context-responsive design-based approach.

**Conclusion**

DBR emerged as a way to “bridge the gap between academic research and educational practice” (Stemberger & Cencic, 2014, p. 64) and as an approach that incorporates the qualities of successful school improvement initiatives, while also providing a way for researchers to develop grounded theories in local contexts. This study identifies TAMAM as a possible application of DBR and DBIR for school-based improvement interventions, highlighting the prominent characteristics as perceived by the TAMAM PST and members of the educational community where it is implemented. It also claims that the use of a design-based approach as a theoretical framework needs to be extended to designing school-based improvement initiatives, especially in contexts similar to the Arab region.

Identifying TAMAM as aligning with a design-based approach is useful for its designers, as it situates the project in the larger context of the literature on DBR and DBIR, hence broadening the scope of resources that can inform and improve the culturally grounded evolving design and implementation. Particularly, because TAMAM was not intended to be either DBR or DBIR, the results of this study help the PST to define and explain the approach that naturally developed as the researchers responded to the needs of the project and participants. Other designers, particularly in the Arab
region, can benefit from the suggestion that design-based approaches are appropriate models to meet the education reform needs of the region and look to the redefinition of the characteristics presented here to inform design efforts.

This study also contributes to the larger conversation on design-based approaches in education by alerting researchers to the use of DBR or DBIR for studying contextually responsive school-based reform. TAMAM has shown favorable results for school-based reform, and for that reason, the authors suggest that a design-based approach, and particularly one such as DBIR that emphasizes capacity building, can be an effective model for school improvement that promotes top-down support for bottom-up change in an Arab context.

The study provides a promising start for further research. Variations found in the understanding of certain characteristics in TAMAM could provide researchers with pointers on how design-based approaches can be applied to similar projects. The framework provided can be used to evaluate and describe school-based reform projects as opposed to the classroom-focused projects that typically utilize DBR and DBIR. The rubric used for analysis can be simplified to reflect the elements presented that are fundamental for school improvement to inform further research, both in the Arab world and other similar contexts.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References


**Author Biographies**

**Rima Karami-Akkary** is an associate professor of Educational Administration, Policy and Leadership in the Department of Education at the American University of Beirut. She is the PI and director of TAMAM project—a research & development initiative on school-based reform in the Arab region—funded through grants from Arab Thought Foundation, Lore Foundation, and Taawon Association.

**Jennifer DeKnight** is a graduate student at the Department of Education at the American University of Beirut. She is completing her MA in Education Administration and Policy Studies, and graduated with a BA in History from Davidson College.